

WHAT IS CLAIMED IS:

1. An immersion lithography system, comprising:

a light source; and

an imaging module projecting a pattern onto a light sensitive material, the light sensitive material covered by an overlying protective film and immersed in an immersion medium,

wherein the protective film does not interfere with the imaging module and light source for projecting the pattern on the light sensitive material through the immersion medium.

2. The immersion lithography system as in claim 1 wherein said protective film being impermeable of outgases from the light sensitive material.

3. The immersion lithography system as in claim 1 wherein said protective film and the immersion medium have nearly matching indices of refraction.

4. The immersion lithography system as in claim 1 wherein said protective film is of irregular thickness.

5. The immersion lithography system as in claim 1 wherein said protective film has a planarized surface.
6. The immersion lithography system as in claim 1 wherein said protective film is non reactive and benign of physical and chemical interaction with the light sensitive material.
7. The immersion lithography system as in claim 1 wherein said protective film is light sensitive.
8. The immersion lithography system as in claim 1 wherein said protective film is compatible with acetal or methacrylate based polymer or hybrid material.
9. The immersion lithography system as in claim 1 wherein said protective film has a predetermined thickness with which a dissolution of the protective film by the immersion medium during projecting does not impact the protective film for sealing the light sensitive material thereunder.
10. The immersion lithography system as in claim 1 wherein said protective film has a thickness of less than 1000 Angstroms.

11. A method for patterning a light sensitive material, comprising the steps of:

forming a light sensitive material on a substrate;

forming a protective film over the light sensitive material to substantially seal it thereunder; and

subjecting the light sensitive material sealed by the protective film to an immersion lithography system for creating a pattern on the light sensitive material,

wherein the protective film seals the light sensitive material from an immersion medium used by the immersion lithography system.

12. The method of claim 11 wherein the subjecting further includes:

directing an electromagnetic beam through a patterned mask to the immersion medium; and

focusing the beam through the immersion medium and on the light sensitive material.

13. The method of claim 11 further comprising planarizing the protective film prior to focusing the beam.

14. The method of claim 11 further comprising removing the protective film to expose at least a portion of the light sensitive material.
15. The method of claim 14 wherein the removing further includes:

removing the protective film to expose the light sensitive material; and

removing undesired portions of the light sensitive material according to the pattern created.
16. The method of claim 14 wherein the removing further includes removing the protective film along with undesired portions of the light sensitive material according to the pattern created.
17. The method of claim 11 wherein the protective film has an uneven surface with step height variations.
18. The method of claim 11 wherein the protective film has a thickness of less than 1000 Angstroms.

19. The method of claim 11 wherein the protective film has a thickness that exceeds the thickness etched by its dissolution in the immersion medium.

20. The method of claim 11 wherein the protective film is not dissolvable in the immersion medium.

21. A method of fabricating elements of a semiconductor integrated circuit comprising the steps of:

forming a photoresist material on a substrate;

forming a protective film over the photoresist material to substantially seal it thereunder;

directing a light source through a patterned mask to create a patterned beam;

focusing the patterned beam on a predetermined area of the photoresist material;
and

interfacing an immersion medium with at least a lens that focuses the patterned beam on the photoresist material,

wherein a pattern is created on the photoresist material through the protective film by the patterned beam.

22. The method of claim 21 wherein the protective film has a thickness that exceeds the thickness etched by its dissolution in the immersion medium.

23. The method of claim 21 wherein the protective film is planarized.

24. The method of claim 21 further comprising removing the protective film to expose at least a portion of the photoresist material.

25. The method of claim 24 wherein the removing further includes:

removing the protective film to expose the photoresist material; and

removing undesired portions of the photoresist material according to the pattern created.

26. The method of claim 24 wherein the removing further includes removing the protective film along with undesired portions of the photoresist material according to the pattern created.

27. The method of claim 21 wherein the protective film is not dissolvable in the immersion medium.

28. The method of claim 21 wherein the protective film and the immersion medium have nearly matching indices of refraction.